

**WHAT IS CLAIMED IS:**

1. A display device comprising:

a plurality of source signal lines;

5 a plurality of gate signal lines; and

a plurality of pixels arranged in matrix, each of the pixels comprising:

a switching element;

a nonvolatile memory element; and

a pixel electrode,

10 wherein:

an input terminal of the switching element is electrically connected to the source signal line;

an output terminal of the switching element is electrically connected to the nonvolatile  
memory element and the pixel electrode; and

a control terminal of the switching element is electrically connected to the gate signal line.

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2. A display device comprising:

a plurality of source signal lines;

a plurality of gate signal lines; and

a plurality of pixels arranged in matrix comprising a plurality of sub-pixels, each of the

20 sub-pixels comprising:

a switching element;

a nonvolatile memory element; and

a pixel electrode,

wherein:

25 an input terminal of the switching element is electrically connected to the source signal line;

an output terminal of the switching element is electrically connected to the nonvolatile  
memory element and the pixel electrode; and

a control terminal of the switching element is electrically connected to the gate signal line.

30 3. A display device comprising:

a plurality of source signal lines;  
a plurality of gate signal lines; and  
a plurality of pixels arranged in matrix comprising a plurality of sub-pixels, each of the sub-pixels comprising:

5                   a switching element;  
                  a nonvolatile memory element; and  
                  a pixel electrode,

wherein:

an input terminal of the switching element is electrically connected to the source signal line;  
10           an output terminal of the switching element is electrically connected to the nonvolatile  
memory element and the pixel electrode;  
a control terminal of the switching element is electrically connected to the gate signal line;  
and  
each switching element in one of the pixels is electrically connected to different one of the  
15 source signal lines.

4. A display device comprising:

a plurality of source signal lines;  
a plurality of gate signal lines; and  
20           a plurality of pixels arranged in matrix comprising n sub-pixels, each of the sub-pixels  
comprising:

                  a switching element;  
                  a nonvolatile memory element; and  
                  a pixel electrode,

25           wherein:

n lines of the source signal lines are corresponding to one pixel column;  
an input terminal of the switching element is electrically connected to the source signal line;  
an output terminal of the switching element is electrically connected to the nonvolatile  
memory element and the pixel electrode;

a control terminal of the switching element is electrically connected to the gate signal line;  
and

each switching element in one of the pixels is electrically connected to corresponding one of the n lines of the source signal lines.

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5. A display device comprising:

a plurality of source signal lines;

a plurality of gate signal lines; and

a plurality of pixels arranged in matrix comprising a plurality of sub-pixels, each of the

10 sub-pixel comprising:

a switching element;

a nonvolatile memory element; and

a pixel electrode,

wherein:

15 an input terminal of the switching element is electrically connected to the source signal line;

an output terminal of the switching element is electrically connected to the nonvolatile memory element and the pixel electrode;

a control terminal of the switching element is electrically connected to the gate signal line;

and

20 each switching element in one of the pixels is electrically connected to different one of the gate signal lines.

6. A display device comprising:

a plurality of source signal lines;

25 a plurality of gate signal lines; and

a plurality of pixels arranged in matrix comprising n sub-pixels, each sub-pixels comprising:

a switching element;

a nonvolatile memory element; and

30 a pixel electrode,

wherein:

n lines of the gate signal lines are corresponding to one pixel row;

an input terminal of the switching element is electrically connected to the source signal line;

an output terminal of the switching element is electrically connected to the nonvolatile

5 memory element and the pixel electrode;

a control terminal of the switching element is electrically connected to the gate signal line;

and

each switching element in one of the pixels is electrically connected to corresponding one of the n lines of the gate signal lines.

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7. A display device comprising:

a plurality of source signal lines;

a plurality of gate signal lines; and

a plurality of pixel arranged in matrix, each of the pixels comprising:

15 a switching element;

a nonvolatile memory element;

a driver element; and

a pixel electrode,

wherein:

20 an input terminal of the switching element is electrically connected to the source signal line;

an output terminal of the switching element is electrically connected to the nonvolatile memory element and the driver element;

a control terminal of the switching element is electrically connected to the gate signal line;

and

25 the driver element is electrically connected to the pixel electrode.

8. A display device comprising:

a plurality of source signal lines;

a plurality of gate signal lines; and

a plurality of pixels arranged in matrix comprising a plurality of sub-pixels, each of the sub-pixels comprising:

a switching element;  
a nonvolatile memory element; and  
5 a driver element; and a pixel electrode,

wherein:

an input terminal of the switching element is electrically connected to the source signal line,  
an output terminal of the switching element is electrically connected to the nonvolatile  
memory element and the driver element;

10 a control terminal of the switching element is electrically connected to the gate signal line;  
and  
the driver element is electrically connected to the pixel electrode.

9. A display device comprising:

15 a plurality of source signal lines;  
a plurality of gate signal lines; and  
a plurality of pixels arranged in matrix comprising a plurality of sub-pixels, each of the  
sub-pixels comprising:

a switching element;  
20 a nonvolatile memory element;  
a driver element; and  
a pixel electrode,

wherein:

an input terminal of the switching element is electrically connected to the source signal line;  
25 an output terminal of the switching element is electrically connected to the nonvolatile  
memory element and the driver element;

a control terminal of the switching element is electrically connected to the gate signal line;  
the driver element is electrically connected to the pixel electrode; and

each switching element in one of the pixels is electrically connected to different one of the  
30 source signal lines.

10. A display device comprising:

a plurality of source signal lines;

a plurality of gate signal lines; and

5 a plurality of pixels arranged in matrix comprising  $n$  sub-pixels, each of the sub-pixels comprising:

a switching element;

a nonvolatile memory element;

a driver element; and

10 a pixel electrode;

wherein:

$n$  lines of the source signal lines are corresponding to one pixel column

an input terminal of the switching element is electrically connected to the source signal line;

an output terminal of the switching element is electrically connected to the nonvolatile

15 memory element and the driver element;

a control terminal of the switching element is electrically connected to the gate signal line;

the driver element is electrically connected to the pixel electrode; and

each switching element in one of the pixels is electrically connected to corresponding one of the  $n$  lines of the gate signal lines.

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11. A display device comprising:

a plurality of source signal lines;

a plurality of gate signal lines; and

a plurality of pixels arranged in matrix comprising a plurality of sub-pixels, each of the

25 sub-pixels comprising:

a switching element;

a nonvolatile memory element;

a driver element; and

a pixel electrode,

30 wherein:

an input terminal of the switching element is electrically connected to the source signal line;  
an output terminal of the switching element is electrically connected to the nonvolatile  
memory element and the driver element;

a control terminal of the switching element is electrically connected to the gate signal line;

5 the driver element is electrically connected to the pixel electrode; and

each switching element in one of the pixels is electrically connected to different one of the  
gate signal lines.

12. A display device comprising:

10 a plurality of source signal lines;

a plurality of gate signal lines; and

a plurality of pixels arranged in matrix comprising  $n$  sub-pixels, each of the sub-pixels  
comprising:

a switching element;

15 a nonvolatile memory element; a driver element; and

a pixel electrode,

wherein:

$n$  lines of the gate signal lines are corresponding to one pixel row;

an input terminal of the switching element is electrically connected to the source signal line;

20 an output terminal of the switching element is electrically connected to the nonvolatile  
memory element and driver element;

a control terminal of the switching element is electrically connected to the gate signal line;

the driver element is electrically connected to the pixel electrode; and

each switching element in one of the pixels is electrically connected to any one of the  $n$

25 lines of the gate signal lines.

13. A display device according to any one of claims 1 to 12, wherein a ferroelectric memory  
is utilized as the nonvolatile memory element.

14. A display device according to any one of claims 1 to 12, wherein a thin film transistor is utilized as the switching element.

15. A display device according to any one of claims 1 to 12, wherein the source signal line driver circuit is formed on the same substrate as the pixel.

16. A display device according to any one of claims 1 to 12, wherein the gate signal line driver circuit is formed on the same substrate as the pixel.

17. A display device according to claim 15, wherein the source signal line driver circuit or the gate signal line driver circuit is configured with unipolar transistors.

18. A display device according to claim 16, wherein the source signal line driver circuit or the gate signal line driver circuit is configured with unipolar transistors.

19. Electric apparatuses, wherein the display device as set forth in any one of claims 1 to 12 is applied.

20. A display device comprising:

a plurality of source signal lines;

a plurality of gate signal lines; and

a plurality of pixels arranged in matrix, each of the pixels comprising:

a first switching element;

a second switching element;

a capacitor element;

a nonvolatile memory element; and

a pixel electrode,

wherein:

an input terminal of the first switching element is electrically connected to the source signal

line;



an output terminal of the second switching element is electrically connected to an input terminal of the second switching element and the pixel electrode;

a control terminal of the first switching element is electrically connected to the gate signal line; and

- 5        the second switching element is selectively connected to one of the capacitor element and the nonvolatile memory element.